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much of the vagueness throughout the book. Pedagogically this is a serious fault and seriously hampers the usefulness of the book as a text.

The laboratory manual of psychology gives a good selection of typical experiments for a laboratory course, and is bound to prove useful, especially to beginning teachers of psychology. The apparatus to be used with these experiments and suggestions for setting it up and for carrying out the experiments are given in the volume on laboratory equipment.

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The Psychology and Pedagogy of Reading, by EDMUND BURKE HUEY, A. M., Ph. D. The Macmillan Company, New York, 1908. pp. 469.

Dr. Huey's book is well written, largely devoid of technical expressions and particularly well adapted to the needs of the class of readers which it aims to reach.

The book is divided into four principal parts: (I) The psychology of reading (9 chapters). (II) The history of reading and of reading methods (4 chapters). (III) The pedagogy of reading (6 chapters). (IV) The hygiene of reading (2 chapters).

Chapter I, taking the form of an introduction, deals with the mysteries and problems of reading from its beginning in Babylonia, Egypt, and Crete, more than 7,000 years ago. Chapter II treats of the work of the eye in reading. The eye, as is well known, does not move continuously in reading but by a succession of quick, short movements, with one usually unbroken return movement. As to the rate of movement, the results obtained by Dearborn, who used Dodge's method of photographic registration, are accepted. Chapter III investigates the amount of reading matter perceived during a reading pause. This has been measured, with fairly congruent results, by Erdmann and Dodge, Messmer, Cattell, Zeitler and others. It varies with the reading matter. There are limiting factors both on the side of eye structure and function, and on the psychic side. In consequence of the former, the larger the amount read during a reading pause, the more inevitably must be the reading by suggestion and inference from clues of various kinds. The deficient picture of the page is filled in and retouched by the mind; from which it follows that reading must go on by other means than the recognition of letters, and that the number of necessary movements and pauses per line will vary with the nature of the matter read. On the psychic side we are confronted by the narrowness of the attention span and by a third limiting factor, the necessity of interpretation.

The fourth chapter bears the caption "Experimental Studies upon Visual Perception in Reading." Herein are considered the mental processes concerned in perceiving what is presented on the page, and the means by which the mind takes note at such a rapid rate of what is there. The theory of reading by letters is obsolete. Already early experiments by Cattell had led to the conclusion that we read in word-wholes, or sometimes even phrase and sentence wholes. The results of experiments by Erdmann and Dodge argue strongly for the theory of the perception of word-wholes. As these authors point out it is not the constituent parts of any given form that make it recognizable, but the familiar total arrangement. While, of course, it is always possible to analyze the whole into its parts, we do not do this in actual reading any more than in regarding a landscape. Goldscheider and Müller ascertained that there are so-called determining and indifferent letters in words. With increase of familiarity fewer and fewer clues suffice to touch off recognition of a word or phrase. Zeitler's experiments led to the conclusion that the apperception of domina-

ting parts or complexes is the basis of recognition. Word length or total form are minor factors. We arrange, in fast reading, the dominating complexes one after another. The progress may be as rapid as one pleases, but it is none the less successive, though long practice and familiarity with the words may give one the 'illusion' of reading simultaneously what is seen during a reading pause. Messmer's experiments on the whole confirmed these facts. The greater importance of the first half and the upper part of words are additional results of experiment. Chapter V contains a discussion of the nature of the perceptual process of reading. It is difficult to draw final conclusion in the present state of science. All we can do is to survey the collected data and dwell on certain general features.

Chapter VI deals with inner speech during reading and with the characteristics of speech. Though purely visual reading is quite possible theoretically, auditory or motor processes form with most people a constituent part. Language and reading being so intimately connected that we can say with Egger that "to read is, in effect, to translate writing into speech," an examination of the nature of speech generally is resorted to in order to throw some light on the inner speech of reading and its relation to the interpretative processes. This examination, which draws freely on Preyer, Wundt, Joubert, Egger, James and Scripture, brings forth the following important facts: Language begins with the sentence, sometimes but a single word, yet standing for a total idea. We begin with a total meaning and a total intention of expressing this meaning, the development being toward a more and more particular division of it into aspects or parts. Meaning leads, and the idea of the whole dominates the parts. The total idea is not a mere sum of associations, but is an apperceptive unity. Again, if meaning welds the parts of a sentence into unity, the necessities of physical utterance contribute to the same end. The complex machinery required for vocal utterance is in continuous action throughout the utterance of any word or phrase, with no interruptions such as letters, syllables, or even words suggest. Chapter VII discusses the functioning of inner speech in the perception of what is read. The inner readiness for a new combination of words completes itself so readily from a few visual clues that it is unitarily perceived quite as truly as if it existed as a specific memory-whole. But the habits of inter-association and expectancy which bind the units of language into wholes are most deeply founded in the audito-motor mechanism of speech. Even in silent thinking the organization of our speech habits goes on perfecting itself. The carrying range or span of the inner speech being considerably larger than that of vision, the visual range is itself enlarged and its content supported by the more stably organized inner utterance into which the visual percepts are constantly being translated. The reading matter follows closely the associative habits of the language, and the existence of such inter-association habits are, therefore, of prime importance in making possible a large range of inner speech in reading. Chapter VIII is entitled, "The Interpretation of what is Read, and the Nature of Meaning." On the whole, meanings are usually felt as belonging to the larger wholes. Words are felt as having a part in the total, but their function is mainly to help tide one over to a place where a new meaning is suggested or completed. Imagery is a part always secondary or auxiliary to the suggestion and control of meanings. The consciousness of meaning itself belongs in the main to that group of mental states, the feelings, which seem unanalyzable, or at least have a large unanalyzable core or body. The fact is that meaning is part and parcel of word-sound and word utterance, that is, what we take for the latter

two is largely word-meaning. It is safe to say that meanings in reading are mainly feeling reactions and motor attitudes attaching most intimately to, or fused with, the inner utterance of the words, and especially of the sentences, that are read. Chapter IX treats of the rate of reading, and the factors which condition speed. While the difference in reading time from page to page is small with individual readers, each falling into a reading pace most natural to him, the rate of reading varies greatly with different individuals. Experiments by Huey and Dearborn show that there can usually be much improvement. The thing to do is to make an effort to get away from our usual plodding pace, to read persistently as fast as possible and with well concentrated attention.

Part II, embracing chapters X to XIII, discusses "The Beginnings of reading, in the interpretation of gestures and pictures," "The Evolution of an alphabet and of reading by alphabetic symbols," "The Evolution of the printed page," and "The History of reading methods and texts."

The pedagogy of reading is taken up in the next six chapters (Part III) which are given to the following topics: "Present-day methods and texts in elementary reading," "The Views of representative educators concerning early reading," "Learning to read at home," "Learning to read at school," "Reading as a discipline, and as training in the effective use of books," "What to read; the reading of adolescents."

In part IV, treating of the hygiene of reading, "Reading fatigue" and "Hygienic requirements in the printing of books and papers" are discussed.

In the concluding chapter Dr. Huey takes up the future of reading and printing, showing possibilities of improvement which have never been canvassed, and for the elimination of waste. What we need now is more of particular researches on specific problems to furnish us with yet more of fact and of suggestion.

M. W. MEYERHARDT.

Das Pferd des Herrn von Osten (Der kluge Hans), ein Beitrag zur experimentellen Tier- und Menschen-Psychologie, von OSKAR PFUNGST. Leipzig, Johann Ambrosius Barth, 1907. pp. 193.

It is rare that an experimenter is able to make a notable contribution, in a single piece of work, to both human and animal psychology, but that Dr. Pfungst has done in the case of a baffling problem by acute observation and a systematic application of the experimental method. The situation was briefly this. In 1904 there appeared in Berlin a remarkable reckoning stallion, the property of a retired schoolmaster living in one of the meaner quarters of the city, and making no effort to profit by the exhibition of his property. The horse was able besides doing other wonderful things to indicate by taps of his hoof the answers to problems involving the usual rules of simple arithmetic, including fractions, and to do this not only in the presence of his master, but also when the latter was absent and the problems were proposed by others whom it was quite impossible to suspect of fraud or collusion. Public interest in the matter was considerable and different sections of the public passed characteristic judgments upon the case. One party declared the case nothing but a piece of clever trickery; another held it to be a definite demonstration, at last, that animals could reason; while a third saw in it something occult, perhaps a case of telepathic transference of the results of the calculations from the mind of the master to that of the horse. The old schoolmaster himself declared that he had simply taught the horse arithmetic by regular pedagogical methods and that the horse had learned as children learn. Public interest ran so high that an in-